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Devoted to the Safety, Health and Welfare of Industrial Workers  
and the Advancement of the Science of Industry

29 West 39th Street, New York

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February 6 1915

Mr A A Anderson Chairman  
The Mayor's Central Committee on  
Street Traffic and Safety  
City of New York

Dear Sir

Following your suggestion that The American Museum  
of Safety make recommendations for the consideration of The  
Mayor's Central Committee on Street Traffic and Safety, with  
a view to recommending <sup>means of preventing</sup> accidents, other than vehicular, I  
take pleasure in submitting to you, as Chairman, the following  
study.

In the opinion of the Museum, the casualties due to  
sidewalk hazards can be greatly reduced.

If the Museum can serve your Committee further,  
please do not hesitate to call upon us.

Very truly yours

Director

Some Sidewalk and Street Accidents  
Other Than Vehicular

- 0 -

In Manhattan alone in 1912 and 1913, there were 37 deaths due to falls on sidewalks and stairs. In 1914, the Coroner's office recorded, for the same district, 68 deaths from falls on sidewalks and 102 from falls on stairs. There is no record of subsequent deaths, and permanent and minor disabilities resulting from the same causes. But if we assume the ratio of deaths to total injuries to be about the same as in other classes of accidents we find that the total number of injuries per year in Manhattan alone runs something like 14,800 from falls on stairs and 10,670 from falls on sidewalks. These figures do not include countless other accidents from running into obstructions, being knocked over by falling signs during wind storms and kindred causes.

Compared with other hazards, it is to be noted that few, if any, are as serious as those of sidewalks and stairs. In 1914, in Manhattan, surface cars killed 53; subway, 12; elevated railways, 12; and fires, 65. The total of these four is 142, while the total for falls on sidewalks and stairs for the same period and district is 170.

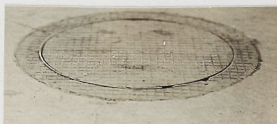
Even a casual inspection of our sidewalks shows astonishingly hazardous conditions. Slippery surfaces, such as coal-hole covers, sidewalk and vault lights, curb edgings and vent grates are hazards that are most common and productive of serious accidents. The glass surfaces of vault lights and the usual iron borders around them if not protected are always dangerous, but under certain weather conditions are a positive menace to the safety of pedestrians.



Unsafe and slippery coal-hole covers are a prolific source of sidewalk accidents

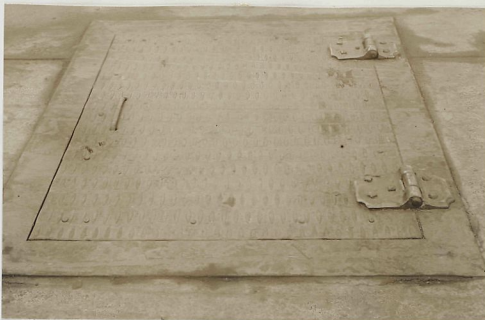


Nine accidents in one day on this cover were reported to a single casualty insurance company



A safe coal-hole cover is made of slip-proof abrasive-metal with no heel-catching projections or depressions

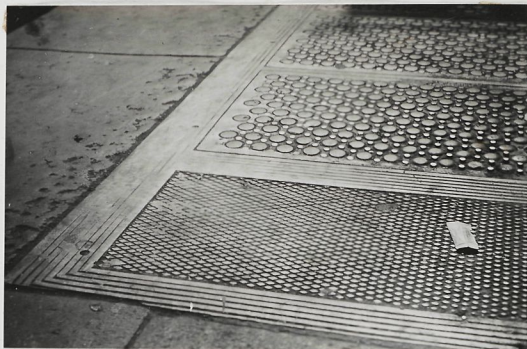
Coal hole and manhole covers are extremely vicious hazards. A single casualty insurance company in one day received reports of nine different accidents on one coal hole cover. The condition in which fully seventy per cent of the covers are found is beyond excuse. Around the old Post Office Building, at Park Row and Broadway, are upward of two dozen covers in the sidewalk that are in dangerous condition. The "East Side" has countless numbers of these hazards; but they are plentiful elsewhere.



Cellar door or coal-hole cover, cover-hinges should be on the underside to avoid tripping. Diamond steel plate is frequently very slippery.



The scene of a fatality. A woman coming out of the store slipped on the steel plate or glass vault lights in the sidewalk, struck her head on the stone sill and died soon afterward.

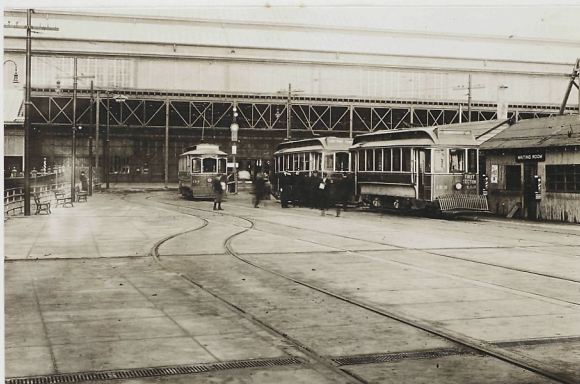


Metal frames or borders around sidewalk lights are very common and exceedingly dangerous.

All surfaces where people walk should be so constructed and maintained that slipping on them is impossible. Corrugations or other irregularities of metallic surfaces do not make them slip-proof. Borders of iron around sidewalk lights, steel and iron coal-hole covers, metal curb edgings and other surfaces usually metallic, should not be employed unless there is embodied in the metal some abrasive that will render it slip-proof.



The New York City Department of Docks and Ferries in the new Terminal at St George, Staten Island, used over a thousand feet of slip-proof drainage gratings and expansion joint cover plates to provide safe footing for the many people walking over the concourse. In this case, the material used was cast iron with a wearing surface embodying alundum grit in such a way that it is absolutely slip-proof and extremely durable.



Slip-proof drainage gratings and expansion joint cover plates in the concourse of the St George Ferry Terminal  
(Built by the City)

Granolithic or cement surfaces where there is a grade or ramp are the source of many accidents. Frequently some good abrasive such as carborundum or alundum is trowelled into the cement or occasionally used as a part of the mix. This is considered by some to give good results. No definite conclusion has been reached. However, it appears from observation that when the surface is dry, nothing special is needed; but if wet it is not made slip-proof by this provision. Crosses or narrow strips of abrasive-metal or other proven slip-proof material should be required at such places.



Here a man coming out of the building slipped on the slight incline in the sidewalk and falling backward crushed his head on the sharp edge of the blue-stone steps. Death was almost instant.





The Brooklyn Edison Company used crosses of slip-proof material set in the cement surface of the sidewalk where it sloped considerably to make a cut for driveway.

The same methods should be used in making safer glass sidewalk light areas. Lead rings or crosses are not efficient. An abrasive metal guard with the grit projecting sufficiently above the surface to give the necessary "bite", has been used extensively. In the sidewalks in front of the new Western Union Building, on Dey Street, and at 17 Madison Avenue, this type of guard against slipping is set between each glass and proves quite effective.

Tripping and other hazards as well as slipping hazards are found on the sidewalks. Fire plugs, railings, steps and other obstructions are the cause of many painful accidents. The Siamese sprinkler connections for fire engines are usually placed in the sidewalks in a very dangerous manner and are particularly unpleasant things for the pedestrian to bump into. Open cellar doors, without railings or other guards, are frequently met with and are especially dangerous. Stairs leading from almost the middle of a sidewalk up to the first floor or down to a basement should be absolutely prohibited, but they are to be found in large numbers, especially in the more crowded districts. Gratings and similar devices frequently have openings in them large enough to catch one's heels and cause a painful injury, or even a fatal fall.

The question of the proper placing of Siamese connections and fire plugs presents many difficulties. The Fire Department usually has jurisdiction in this matter, with the result that while these devices are convenient in cases of fire they constitute a peril to pedestrians in the meantime. The Building Department hesitates to interfere. It should be possible to place these connections so that they would be convenient when wanted for use and yet not constitute a dangerous hazard when not in use.



Obstructions and holes in sidewalks constitute menaces that are inexcusable in many cases. Here in one photograph are shown several hazards of both types.



Siamese sprinkler connections should be placed in a box flush with the curb or in recesses of the building walls.

Sidewalk entrances to cellars seldom have suitable guards.

Most often the doors are thrown back on the sidewalk. Sometimes they are opened and stood up on edge or a flimsy rail is placed around. Neither expedient prevents people from falling in. Occasionally a good substantial guard around the opening with a wire grating in it are found. Such provisions as this should be required.



Ineffectual attempt to guard  
a sidewalk cellar entrance



A properly guarded sidewalk  
cellar entrance

Swinging signs constitute another menace. After every wind storm we read in the papers of one or more killed and several injured by being struck with a sign that has blown loose.



A rusty nail and badly corroded wire are all that  
temporarily keep this sign from falling on someone's  
head



Many people are severely injured by falling into unguarded areas-ways.



Holes in sidewalks due to the breaking away of concrete are frequently found. Such conditions are bound to occur, but what makes this matter worthy of attention is that they are not promptly repaired. One particularly bad place on a busy street in the down-town section of New York has been tripping and throwing scores of persons daily for nearly a year. Though the condition of this sidewalk is not bad as they go in New York, nevertheless it gained a verdict and substantial award for the man that broke his ankle.

In certain districts where much shipping or manufacturing is done there are many conditions that could be improved. Materials of all kinds are piled on sidewalks regardless of the hazard. Shipping platforms seem to be forgotten. The sidewalk serves the purpose and pedestrians must use the street. Boxes and crates, loose castings, tin articles such as stove pipe with sharp cutting edges are piled about in grand confusion. Occasionally, where there is a platform, the steps a pedestrian must use to get up when a wagon is being loaded or unloaded have treads that are narrow, slippery and frequently broken.



The tin pipe and condition of slippery platform with broken steps constitute a decided hazard

Sidewalk obstructions are not confined to manufacturing districts. Liability insurance inspectors, complain with good reason, of materials of all kinds obstructing street and sidewalk at nearly all new building operations.





Scene of another accident for which plaintiff received substantial award. Sidewalk obstructions, especially around new building operations, should be prohibited.



It is unsafe for pedestrians when coal is being unloaded through an unguarded open hole in the sidewalk



Every coal wagon should be compelled to carry a guard as part of their equipment. When unloading through sidewalk hole it should be compulsory to use it.

While coal is being unloaded through a coal-hole in a sidewalk, a guard should be placed around the hole. A similar guard should always be used around open manhole covers. In Philadelphia, recently, it was ascertained, that in only about 60% of cases where coal was being unloaded a suitable guard was used to prevent persons from falling into the hole. Sometimes a shovel was laid across the hole. More often no thought at all was given to the danger. In New York, probably less than 20% of open coal-holes are guarded. Fortunately, the majority of manholes are used only by public utilities companies, and usually are guarded. Why not use a similar guard around coal-holes? Each wagon should carry such a guard as part of its equipment.

From the figures given earlier, it will be noted that stair accidents are more numerous than those on sidewalks. Injuries sustained in stair accidents are usually more severe than those on sidewalks.

Many stair accidents are caused by bad lighting. This can be remedied easily in the few public stairs under City jurisdiction where such a condition is found. Other accidents are caused by poor proportioning of tread width to riser height. The United States Steel Corporation standard calls for the sum of tread and riser to equal about 17 and 1/2 inches. No stair should be built at a greater angle with a horizontal than 45°, or at an angle of less than 30°. The following table is subjoined for reference:

Angle with horizontal	Riser Inches	Tread Inches
30.35	6 1/2	11
32.03	6 3/4	10 3/4
33.41	7	10 1/2
35.16	7 1/4	10 1/4
36.52	7 1/2	10
38.29	7 3/4	9 3/4
40.06	8	9 1/2
41.44	8 1/4	9 1/4
43.22	8 1/2	9
45.00	8 3/4	8 3/4

The most dangerous of stair hazards is the inexcusably bad condition of the treads. In many cases they do not look hazardous; but some of the most ornate stairs are among the most dangerous. The great number of accidents have a definite underlying cause.



Cement steps if trowelled hard are slippery - if not trowelled hard they granulate - and regardless of how they are trowelled they chip off at the edges. A slip-proof tread will overcome the troubles and make the steps safe.

It has been proven that a smooth steel or brass nosing strip is dangerous. For instance, from a safety standpoint, there is no objection to rubber on a stair tread if it is carried down over the nosing edge; but there is a decided hazard in the brass or steel nosing strip frequently used in connection with such treads. When the inevitable slip on such a nosing occurs, as a person goes down stairs, the foot slides forward and the front edge of the heel catches in the little offset formed by the rubber having worn faster than the metal nosing. As the heel catches, the foot is stopped; but the forward motion of the upper part of the body continues so that the person is thrown forward, usually striking on his head. This is the reason so many stair accidents result fatally by concussion of the brain.



Cast iron and steel treads are unsafe because they are slippery. Here an attempt was made to overcome the slipping hazard by weaving rope through perforations.



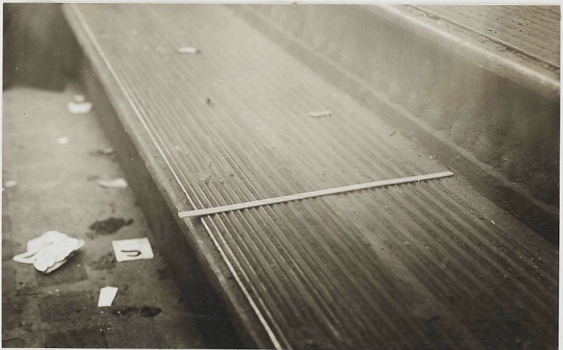
A person coming down steps usually carries his weight with the ball of his foot on the edge of the step.



A smooth metal strip along the nosing of a step is dangerous. Many accidents are occurring on stairs as shown in the Municipal Ferry Boats.



Many stair treads have a series of grooves back of and parallel to a slippery metal contact along the nosing edge. On such treads, people not only slip on the edge, catch their heels and sometimes toes with fatal results, but also find it difficult when going down to distinguish which one of the lines, all running in the same direction, is the line of the edge of the step. If the light is bad or eyesight poor this hazard is very great.



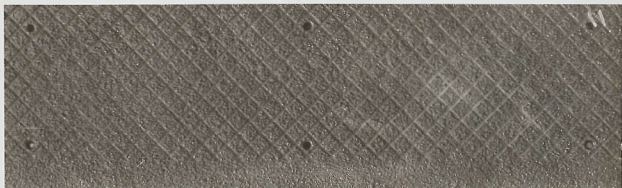
This type of tread caused 21 accidents in six weeks on one stair - owing to the combination of slippery nosing edge and heel-catching grooves. After the stair was equipped with safe treads, there were no accidents on it in three months.



When looking down steps covered with grooved treads it is difficult to distinguish which one of the lines running in the same direction is the line of the edge of the step.

Action should be taken at once to reduce and, where possible, to eliminate these dangerous conditions. While it is easy to point out hazards, it is extremely difficult to get the proper repairs made. There seems to be no definite jurisdiction in such matters. Policemen are supposed to report slippery coal-hole covers and similar dangerous places. They do report them, but what becomes of the reports? Casualty insurance inspectors call the attention of their clients to dangerous places. Sometimes their advice is taken, but in the majority of cases, the property owner is apathetic. Architects and builders could prevent many hazards by proper attention to such details, but will not give this attention unless it is compelled by the Building Code.

Requisite safe construction of sidewalks and appurtenances should be insured by definite rulings and ordinances, and jurisdiction in such matters should be clearly defined. As a revision of the Building Code of New York City is now under way, these matters might be considered in connection with it.



A good slip-proof material used especially for stair treads, but obtainable in any form desired, is made of iron and aluminum cast in it in such a manner as to prevent slipping.

It seems to us that there is no reason why some one of the City Departments should not be charged with ascertaining facts regarding the condition of the City streets and sidewalks. This idea has been carried out very successfully in New Haven, Conn., where the following information is noted on cards:

1. Defects in sidewalks, or roadways which need immediate attention and report the same to headquarters when returning your cards, so that repairs can be made.
2. Curbing or sidewalks which should be repaired, or resurfaced.
3. Places where new sidewalks should be ordered.
4. Places where guard railings, or fences should be repaired, or built at the top of embankment to protect pedestrians.
5. Low hanging limbs, or wires, and dangerous trees.
6. Sidewalk obstructions such as outside store displays, building material, overhanging signs, etc.
7. Roadway obstructions such as building material, rubbish, empty wagons, etc.
8. Bad drainage conditions in roadway, such as standing water, stopped up catch basins, etc.
9. Miscellaneous.